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Client Name/Job Description: USEPA Region VIII / ARCS WA37 Site Assessment Activity

Job/Charge Numbers: 0 1 0 8 6 5 (Job No.) 3 7 0 3 0 3 (Charge No.)

Document Title/Project Phase: Health & Safety Plan for soil & Groundwater Sampling at Mound Street PCB Site

Document Type	Identify specific section or segment covered by this checkprint	Document Origin
☐ Priced Proposal		☒ Originator Developed
☐ RFP		☐ Edited Standard
☐ Contract/Subcontract		☐ Client Furnished
☐ Work Plan		
☐ SAP, CDAP or QAPP		Document Status
☐ _____ Report		☒ Draft
☐ Site Assessement Report		☐ Draft Final
☐ Specifications & Plans		☐ Final
☐ Design Calculations		☐ Other: _____
☐ Tables		
☐ Drawings		
☒ Other: Health & Safety	All	

	Required Person	SIGNATURE (MUST BE LEGIBLE)	DATE
Originator	MWM	Michael McCurdy	1/18/96
Checker	BK	Brian Kraus	1/29/96
Backchecker			
Updater		Michael W McCurdy	2/2/96
Rechecker			
Tech. Reviewer		Brian Kraus	1/29/96
Tech. Reviewer			
Tech. Reviewer			
Project Manager			

Note: Rechecker is same person as checker.
Backchecker is same person as originator.

Site: Mound St. PCB
ID #: MOOOOO93682
Break: 1.3
Other: 2-8-96

30024038
Superfund

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Health and Safety Plan

for

Soil and Groundwater Sampling

at

Mound Street PCB Site
100 Mound Street
St. Louis, Missouri

February 8, 1996

Prepared by:

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HEALTH, SAFETY, AND EMERGENCY RESPONSE PLAN

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1.0 INTRODUCTION

This Health, Safety, and Emergency Response Plan (Health and Safety Plan) defines applicability and responsibilities during soil, sediment, surface water and groundwater sampling at the Mound Street PCB Site in St. Louis, Missouri.

1.1 SCOPE AND APPLICABILITY

The purpose of the Health and Safety Plan is to define requirements and protocols to be followed at the Mound Street PCB Site to protect the health and safety of site workers who may be impacted by the soil and groundwater sampling work. Applicability extends to all Sverdrup employees. This plan must be reviewed by all Sverdrup personnel prior to working at the Site.

This health and safety plan covers the following site activities:

- Sampling of two (2) existing wells.
- Collection of seven (7) subsurface soil samples.
- Sample collection equipment decontamination.
- Sample preparation and packaging.

All personnel on-site shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This Health and Safety Plan summarizes those hazards and defines protective measures planned for the site.

The Health and Safety Plan guidelines and requirements are based upon field activities conducted by the Missouri Department of Natural Resources in 1993 and 1994, Ecology and Environment during 1988, 1990 and 1991, and St. Louis Metropolitan Sewer District during 1993, and are subject to revision upon subsequent discoveries regarding potential hazards at the Site. All field work will be performed to comply with the Occupational Safety and Health Administration (OSHA) 29 CFR 1910 and 1926.

1.2 VISITORS

All Visitors entering the sampling areas will be required to read and verify compliance with the provisions of this Health and Safety Plan. Visitors will be expected to comply with relevant OSHA regulations and visitors will be expected to provide their own protective equipment.

In the event that a visitor does not adhere to the provisions of the Health and Safety Plan, he/she will be requested to leave the work area. All nonconformance incidents will be recorded in the site log. If present, representatives of the property owners will be required to prepare their own Health and Safety Plan and adhere to their specific protocols.

1.3 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.3.1 Site Location and Description

The Mound Street PCB Site is located in the City of St. Louis at the eastern end of Mound Street (near the intersection of Mound Street and First Street). The site is on the western side of the concrete flood wall. The geographic coordinates of the site are 38° 38' 34.0" north latitude and 90° 10' 57.2" west longitude. The site can be reached by traveling north on Broadway from Interstate 64 or south on Broadway from the Salisbury Street exit off Interstate 70. From Broadway take Mullanphy Street east, and turn left onto a gravel roadway just pass the Apex Oil facility on the left. Take the gravel roadway north to Mound Street. The site is encompassed by Mound Street, the gravel roadway, and the Apex Oil facility.

The total area of the site is estimated at approximately 1.5 acres (MDNR 1994a, Sverdrup 1995a & b). The buildings on the site were demolished in 1991, and the property currently has no structures upon it. The property is owned by McKinley Iron, Inc. located at 3620 North Hall Street, St. Louis, Missouri. Mr. Herman Gellman, representative of McKinley Iron, was present during a portion of the site reconnaissance activities conducted at the site on December 6, 1995. Mr Gellman did not know if the basement walls and floor were removed during building demolition. He did state that the basement area was filled with demolition debris. He was not aware of any unusual observation made, such as stained soil, during the building demolition. He estimated the basement depth to be between 12 and 14 feet. Mr. Gellman stated the property was originally purchased from Union Electric to salvage power plant equipment.

The site is roughly rectangular in shape and is bordered on three sides by industrial property (Figure 1). Gravel roads are located along the property perimeter, with Mound Street being the northern boundary. An east-west path has been made which splits the property. No fencing or other barrier exists around the property. Bricks, rock, wood, metal, brush, and concrete debris are located on the southern portion of the property. Several small soil piles were observed along the southeastern edge of the property. Two 55-gallon drums were also observed adjacent to the debris. No visible markings were noted on the drums and no attempt was made to open them. The northern portion is overgrown with grass and weeds. Exposed soil, approximately four feet square, was observed on the northern portion of the property. The general surface runoff is toward the east and south. Toward the east is vacant property with railroad tracks, a concrete flood wall, and then the Mississippi River (Sverdrup 1995a & b).

The Metropolitan Sewer District, Brooklyn Street pump station is located approximately 575 feet north-northeast of the site. The pump station is located on the west side of the flood wall. Two wells sampled in 1991 by E&E/FIT and three manholes sampled by MSD in 1993 were identified. An abandoned pump house, once part of the Mound Street Power Plant, is located on the east side of the flood wall. The abandoned pump house is in poor condition. At the time of the site reconnaissance visit, the water level of the Mississippi River was at the bottom of the pump house. According to Mr. Gellman, the property occupied by the abandoned pump house was deeded to the City of St. Louis for construction of a bike path along the river (Sverdrup 1995a &b).

The site occupies part of the land which was the location of the Laclede Gas and Light Company former manufactured gas plant (FMGP) in the late 1800s to the mid-1940s. Laclede Gas used a retort process for coal carbonization in the generation of gas. Approximately 930 million gallons of coal tar waste were produced at this facility. It is estimated that approximately 76 percent of

the waste was sold, with the remaining 24 percent being buried on-site. This equates to approximately 224 million gallons of coal tar waste potentially buried at the site. On-site burial was typically conducted in unlined pits. In 1940, operations were split between Laclede Gas Light Company (Laclede Gas) and Laclede Power and Light Company (Laclede Electric).

In 1945, Union Electric purchased the entire coal gas facility and operated the Mound Street Power Plant from 1945 to 1973. Union Electric did not manufacture coal gas at this site. In 1969, the Apex Oil Company purchased the former coal gas works (Laclede Gas works) from Union Electric; however, UE continued to operate the electrical facility from the former Laclede Electric facility. The Apex Company utilized the site as a tank farm for the storage of petroleum fuels until the mid-1980s, when it became an asphalt product terminal.

In 1973, the Union Electric property was transferred to the Tenlis Company. Tenlis dismantled the power generation and transmission equipment. Transformer oil was reportedly disposed by Midwest Oil Company. The dismantled equipment was sold as scrap metal.

In 1981, Tenlis transferred the property to AZCON. The operations of AZCON are unknown, however, it was reported in the Mound Street Power Plant PA report that AZCON could have been a metal recycling company.

In 1985, Mound Street Corporation became the property owner and leased the building to an individual for an electric motor stripping operation. An oil fire occurred in the basement of the building in 1989, and the building was demolished in March of 1991.

McKinley Iron became the owner of the property in 1993. The property does not have any buildings or other structures and is currently vacant.

1.3.2 Previous Site Investigations

The Mound Street PCB Site has had numerous investigations conducted since 1976.

- The Missouri Department of Natural Resources (MDNR) submitted a Preliminary Assessment (PA) report on the Mound Street PCB Site on March 21, 1994. Field activities for the PA occurred on November 11, 1993. No samples were collected during the PA. The conclusions of the PA report indicate that a threat from the groundwater pathway is very unlikely, a release to the Mississippi River appears likely, an exposure through the soil pathway is low and an exposure through the air pathway is also low.

- On July 8, 1993 St. Louis Metropolitan Sewer District (MSD) personnel discovered oil seeping into the Brooklyn Street storm water pump station, located at the end of Brooklyn Street and approximately 400 feet north of the Mound Street PCB Site. A waste oil sample from the pump station wet well was collected and analyzed for PCBs by the MSD. A PCB concentration of 47 mg/L was detected. On August 9, 1993, a waste oil sample from three manholes were collected and analyzed for PCBs by the MSD. The concentrations of PCBs were 25.4 mg/L in Manhole F-GA1 (#12), 11.7 mg/L in Manhole F-GA1 (#13), 36.6 mg/L in Manhole F-GA1 (#14). Five 55-gallon drums of waste oil were pumped out of the storm sewer by REACT Environmental Engineers and disposed by Tipton Environmental Services.

A 12,000-gallon underground storage tank (UST) containing petroleum products was discovered during an investigation to identify the potential source of the PCBs in the MSD pump station. The UST was located on Terminal Railroad Association (TRRA) property, southwest of the Brooklyn Street pump station. The TRRA property is located on the north side of Mound Street, directly across from the Mound Street PCB Site. A sample was collected from the UST on July 14, 1993 by MSD. Sample analysis showed PCBs in the UST at 39 mg/L. The existence of the UST was unknown to TRRA prior to notification by the St. Louis Fire Marshall. The tank contents were removed by Environmental Operations, under supervision by GEHM Corporation, on August 4, 1993. Sample analysis of the tank contents showed PCBs at less that 10 mg/kg. Sixteen 55-gallon drums of waste were removed from the UST. On August 17, 1993 EnTech Engineering, under supervision by GEHM Corporation, conducted an Infrared Thermograph survey of the TRRA Site. No evidence of a leak plume was identified during this study. An anomaly was discovered, approximately 10 foot square, on the Mound Street PCB property. Boreholes were attempted at the location of the anomaly; however, they were abandoned after auger refusal at a depth of 5 feet due to encountering solid rock debris. The foundation or basement of the demolished Mound Street Site buildings could explain the IR/T anomaly.

- The Ecology and Environment/Field Investigation Team (E&E/FIT) submitted a Screening Site Investigation (SSI) report on the Laclede Gas and Light FMGP Site on October 29, 1991. Field activities for the SSI occurred on March 3-9, 1991. Subsurface soil, surface soil, sediment, surface water and groundwater samples were collected at and around the Petroleum Fuels and Terminal Company property. No samples were collected from the basement of the Mound Street Power Plant Building (Mound Street PCB Site), as originally planned, since the building was being demolished at the time of the SSI field activities. Five borehole screening locations, four surface soil sample locations, three groundwater sample locations, three surface water sample locations, and three sediment sample locations are in the vicinity of the Mound Street PCB Site. Analytical results for the soil screening samples, sediment samples and surface soil samples are shown in Table 1-1. Five groundwater samples were collected. Groundwater sample analysis shows 65 ug/L acenapthalene, 25 ug/L fluorene, 46 ug/L phenanthene, 93 ug/L benzene and 1600 ug/L cyanide in Well 204. Well 203 sample analysis did not show any contamination except for 590 ug/L cyanide. Both cyanide results are "J" coded, the value is reported but not valid under approved QC procedures. Well 206 did not show any contamination. Arsenic, barium, copper, chromium, nickel, selenium, vanadium, and zinc were not detected in four surface water samples except as indicted in the following discussion. Surface water sample analysis show lead levels ranging from 7.0 ug/L to 24 ug/L. Sample location 303 also showed barium at 280 ug/L, vanadium at 62 ug/L, zinc at 89 ug/L and an invalid selenium result of 11 ug/L. Sample location 304 and 304D showed chromium at 14 ug/L and 12 ug/L, respectively. Sample location 304 also had a result of 54 ug/L for zinc. None of the samples collected during the SSI were analyzed for PCBs.

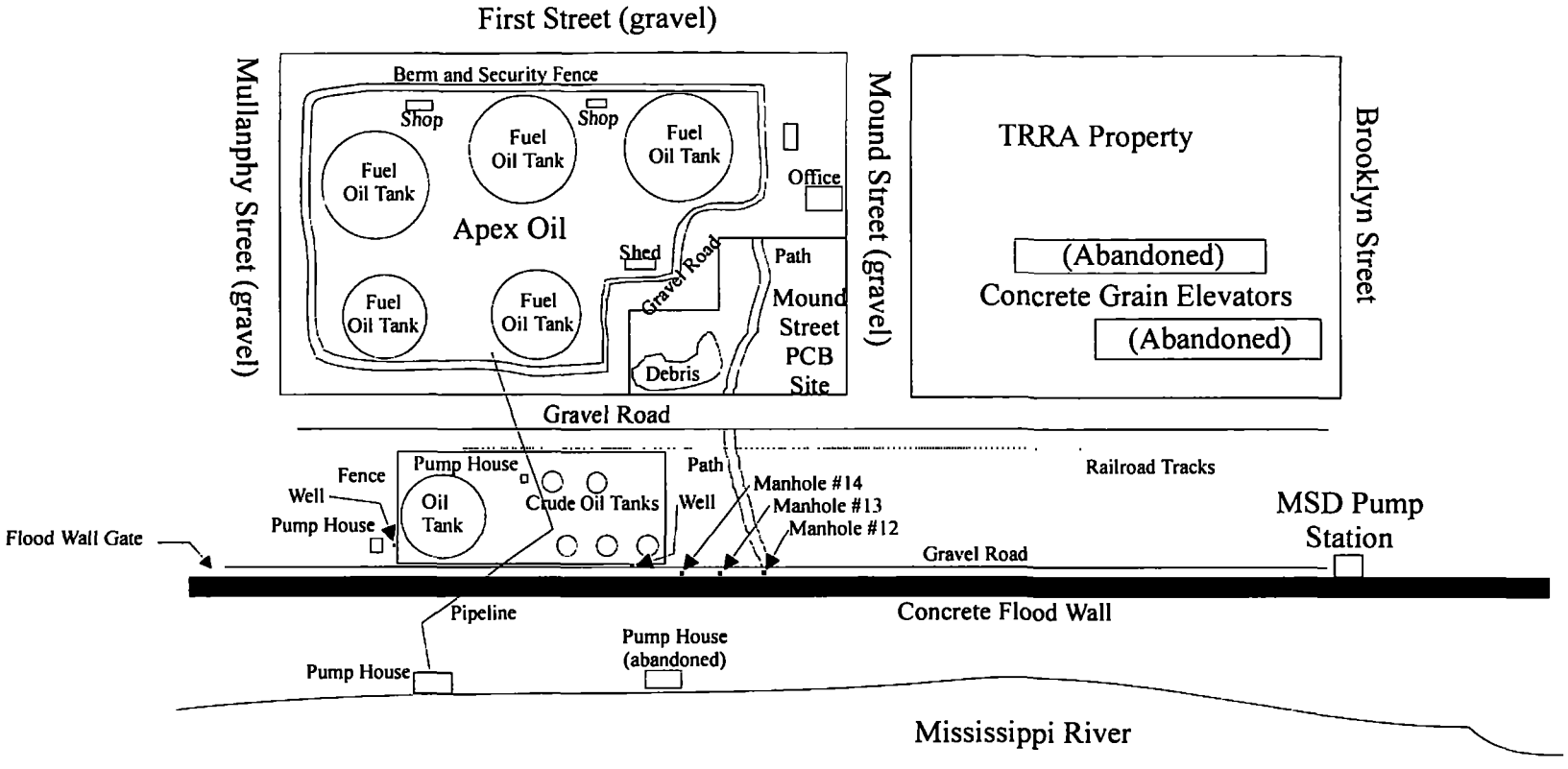
- The E&E/FIT conducted a site reconnaissance of the Laclede Gas and Light FMGP on November 20, 1990 for the preparation of the SSI work plan. Seepage was observed emanating from the foundation and piping system of an abandoned pump house, formerly owned by the Mound Street Power Plant. The pipes were reportedly plugged with concrete, however, seepage was leaching through the concrete. The pump house is located on the eastern side of the flood wall, therefore, the seepage was going directly into the

Mississippi River. No samples were collected during the site reconnaissance.

- The E&E/FIT submitted a Preliminary Assessment (PA) report of the Laclede Gas and Light FMGP on June 23, 1988. The field activities were conducted on September 17, 1987. Six oil, water and oil/water mixture samples were collected from the Mound Street building basement and two from adjacent manholes during the PA site reconnaissance. The samples were analyzed for PCBs. No PCB contamination was detected at a 1 mg/kg detection limit in any of the samples. The source of oil in the basement of the Mound Street Power Plant building (Mound Street PCB Site) was potentially identified as the adjacent Apex Oil terminal. It was stated in the report that Apex has had numerous spills, some of which entered the Mound Street building basement. Transformers and hydraulic oil tanks, located in the Mound Street building basement, were supposedly drained and removed in the 1970s; however, no records confirming this were available.

- The St. Louis City Division of Health conducted an investigation of the Mound Street Power Plant on April 8, 1987. Six oil samples were collected from the basement of the Mound Street building and analyzed for PCBs. No PCB contamination was identified; however, detection limits were not recorded.

- The U.S. Coast Guard has investigated oil slicks in the Mississippi River in the vicinity of the Mound Street PCB Site three times from 1976 to 1987. The oil slicks were reportedly originating from the Mound Street Power Plant. The basement of the Mound Street Power Plant was the suspected source of oil. No samples were collected during any of the Coast Guard investigations.



Scale (Approx.)

Scale

0' 200' 400'

N

Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site, St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site. GEHM 1993. Activities Report, TRRA of St. Louis. First and Mound Streets Site. MDNR Spill Report #07143-KB-1331.	Project No.: 010865-370303	Mound Street PCB Site St. Louis, Missouri	Site Location Map	Figure No.: 1
		SVERDRUP		1/96

Table 2-1. Screening Site Inspection, Sample Analysis Results, Laclede Coal Gas Site								
Field Analytical Support Program Mobile Laboratory Screening Results								
Sample No. (Refer to Figure 6a)	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Fluor anthene (ug/kg)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Comments
B01 (borehole soil sample)	1,200	380	1,700	16,000	3,700	NT[A]	NT	0-5 ft sample depth, same location as surface soil sample 101
	9,100	1,200	19,000	27,000	12,000	NT	NT	5-10 ft sample depth, same location as surface soil sample 101
	18,000	710	65,000	56,000	40,000	NT	NT	10-15 ft sample depth, same location as surface soil sample 101
	17,000	770	79,000	13,000	5,200	NT	NT	15-18 ft sample depth, same location as surface soil sample 101
B02 (borehole soil sample)	6,300	43,000	240,000	8,000	<500	<500	<500	0-5 ft sample depth, same location as surface soil sample 102
	6,100	1,700	57,000	15,000	ND[B]	ND	ND	5-10 ft sample depth, same location as surface soil sample 102
	69,000	110,000	570,000	ND	ND	ND	ND	10-15 ft sample depth, same location as surface soil sample 102
	7,500	650	33,000	ND	ND	ND	ND	15-21 ft sample depth, same location as surface soil sample 102
B03 (borehole soil sample)	1,040	22,000	22,000	<500	<500	<500	<500	0-5 ft sample depth
	310	11,000	53,000	ND	ND	ND	ND	5-10 ft sample depth
	1,800	6,300	3,500	ND	ND	ND	ND	10-15 ft sample depth
	860	9,000	5,300	ND	ND	ND	ND	15-21 ft sample depth

Table 2-1.
Screening Site Inspection, Sample Analysis Results, Laclede Coal Gas Site

Field Analytical Support Program Mobile Laboratory Screening Results

Sample No.	Benzene (ug/kg)	Toluene (ug/kg)	Xylene (ug/kg)	Fluor anthene (ug/kg)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Comments
B17 (borehole soil sample)	540	<250	21000	<500	<500	<500	<500	0-5 ft sample depth, ND for 5-33 ft sample depth except for 2,700 ug/kg m-xylene at 5 -10 ft, same location as surface soil sample 108
B18 (borehole soil sample)	<250	<250	<250	<500	<500	<500	<500	0-33 ft sample depth, same location as surface soil sample 109
B23 (borehole soil sample)	<250	<250	<250	<500	<500	<500	<500	0-5 ft sample depth, background soil sample
401 (sediment sample)	<250	<250	<250	NT	NT	NT	NT	Sediment sample
402 (sediment sample)	<250	<250	1,600	<500	<500	<500	<500	Sediment sample
403 (sediment sample)	<250	<250	420	2,600	5,400	4,200	3,800	Sediment sample
301 (surface water sample)	<25	<25	<25	NT	NT	NT	NT	Surface water sample
302 (surface water sample)	<25	<25	<25	NT	NT	NT	NT	Surface water sample
303 (surface water sample)	<25	<25	<25	NT	NT	NT	NT	Surface water sample

Surface Soil Samples--CLP Analysis

Sample No. (Refer to Figure 6b)	Pyrene (mg/kg)	Benzo(k) fluor anthene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluor anthene (mg/kg)	Benzo(a) anthracene (mg/kg)	Chrysene (mg/kg)	Total PAHs (mg/kg)	Cyanide (mg/kg)	Comments

Table 2-1. Screening Site Inspection, Sample Analysis Results, Laclede Coal Gas Site										
101 (B01)	ND[B]	ND	ND	ND	ND	ND	ND	33	0-2 ft sample depth	
102 (B02)	21	ND	ND	ND	ND	ND	21	ND	0-2 ft sample depth	
107 (B16)	ND	ND	ND	ND	ND	ND	73[E]	14	0-2 ft sample depth	
108 (B17)	ND	ND	ND	ND	ND	ND	9.8	98	0-2 ft sample depth	
109 (B18)	6.7	3.4	4.2	4.9	4.5	4.3	40	35	0-2 ft sample depth	
112 (B21, background sample)	1.4	0.68	0.7	0.61	0.79	0.85	6.8	<6.7	0-2 ft sample depth, background soil sample	
Sediment Samples--CLP Analysis										
Sample No. (Refer to Figure 6b)	Pyrene (ug/kg)	Benzo(k) fluor anthene (ug/kg)	Benzo(a) pyrene (ug/kg)	Benzo(a) anthracene (ug/kg)	Cyanide (ug/kg)	Total Hydro carbons (ug/kg)	Total Arsenic (mg/kg)	Total Barium (mg/kg)	Total Chromium (mg/kg)	Total Lead (mg/kg)
401	ND/960[C]	ND/ND[C]	ND/430[C]	ND/460[C]	ND/ND[C]	3,100/ <3,100[C]	3.7/4.0[C]	140/140[C]	8.7/9.0[C]	30J/13J[D]
402	8,000	2,900	2,600	3,500	1,600	8,200	8.4	160	16	36J[D]
403	6,400J[D]	3,100	5,600	4,200	ND	4,900	7.1	160	12	31J[D]

A NT = Not Tested.
B ND = Non detected.
C Sample results/duplicate results.
D J = Results reported but are invalid by approved QC procedures.
E 60 mg/kg naphthalene detected.

Source: E&E/FIT 1991.

2.0 HEALTH AND SAFETY ORGANIZATION

2.1 PROJECT ORGANIZATION

The Sverdrup Environmental, Inc. personnel assigned to perform the work described for this work assignment are as follows:

Michael McCurdy, CHMM Project/Site Manager Sverdrup Environmental, Inc.	Responsible for environmental issues during sampling activities.
Michael McCurdy, CHMM Site Safety Officer Sverdrup Environmental, Inc.	Implement the Health and Safety plan.
B. Knaus, CIH, CSP Health & Safety Manager Sverdrup Environmental, Inc.	Responsible for assembly of the health and safety plan.

2.2 RESPONSIBILITY AND AUTHORITY OF KEY PERSONNEL

The responsibility and authority of key personnel relative to the implementation of this Health and Safety Plan are described below.

Project Manager:

- Verify that the project is performed in a manner consistent with the Sverdrup Health and Safety Plan.
- Verify compliance with the Health and Safety Plan by all Site personnel.
- Coordinate with the Sverdrup Health and Safety Manager on health and safety matters.
- Temporarily suspend field activities if the health and safety of personnel are endangered, pending further consideration by the Sverdrup Health and Safety Manager.
- Report all infractions of the Health and Safety Plan to the Sverdrup Health and Safety Manager.

Site Safety Officer:

A Sverdrup employee will serve as Site Safety Officer for the duration of the field activities. The Site Officer has the following responsibilities:

- Direct health and safety activities on-site.
- Report safety-related incidents or accidents to the Project Manager and the Sverdrup Health and Safety Manager.

- Implement the Health and Safety Plan.
- Maintain health and safety equipment on-site, as specified in the Health and Safety Plan.
- Perform health and safety activities on-site, as specified in the Health and Safety Plan, and report results to the Project Manager and the Sverdrup Health and Safety Manager.
- Maintain documentation of health and safety measures taken at the Site, including:
  - Communication of the Health and Safety Plan;
  - Levels of protection and required upgrades;
  - Environmental monitoring results; and
  - Incident reporting.
- Upgrade or downgrade levels of protection in response to field conditions outlined in the Health and Safety Plan.
- Temporarily suspend field activities, if health and safety of personnel are endangered, pending further consideration by the Sverdrup Health and Safety Manager.
- Report all infractions of the Health and Safety Plan to the Sverdrup Health and Safety Manager.

Sverdrup Health and Safety Manager:

- Develop the Health and Safety Plan for the project.
- Appoint or approve the Site Safety Officer for the project.
- Interface with the Site Safety Officer as may be required in matters of health and safety.
- Monitor compliance with the approved Health and Safety Plan.
- Assist the Project Manager in maintaining health and safety equipment for the project.
- Verify personnel working on the Site have completed medical surveillance and health and safety training.
- Direct personnel to change work practices if they are deemed to be hazardous to health and safety of personnel.
- Remove personnel from the project if their action or condition endangers their health and safety or the health and safety of co-workers.

3.0 SAFETY AND HEALTH HAZARD ASSESSMENT

3.1 CHEMICAL HAZARDS

A hazard analysis has been prepared for the Site contaminants. The hazard analysis utilizes exposure and toxicity information generated by the Occupational Safety and Health Administration, American Conference of Governmental Industrial Hygienists, the National Institute for Occupational Safety and Health, the National Toxicology Program, the International Agency for Research on Cancer and accepted industry data.

The Site Safety Officer, or Health and Safety Manager will perform instantaneous and integrated sampling to determine contaminant concentrations and document the concentration levels.

Benzene

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Blood, Bone Marrow, Central Nervous System, Eyes, Respiratory System, Skin
Hazard:	Flammable (FP 12°F), Toxic
PEL:	1 ppm STEL: 5 ppm
IDLH:	500 ppm
IP:	9.24 eV

Exposure to liquid and vapor may produce primary irritation to skin, eyes, and upper respiratory tract. If the liquid is aspirated into the lung, it may cause pulmonary edema and hemorrhage. Erythema, dry, scaly dermatitis may develop from defatting of the skin. Acute exposure results in central nervous system depression. Headache, dizziness, nausea, convulsions, coma and death may result. Chronic exposure may cause blood changes, anemia, and leukemia. Benzene is a carcinogen.

Chlorodiphenyl (PCB)

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Eyes, Liver, Reproductive System, Skin
Hazard:	Toxic
PEL:	0.5 mg/m^3
IDLH:	5 mg/m^3

Prolonged skin contact with PCBs may cause the formation of comedones, sebaceous cysts, and pustules known as chloroacne. Irritation to eyes, nose, and throat may occur. The PEL for dichlorophenyl (42% chlorine) and dichlorodiphenyl (54% chlorine) are considered effective to prevent systemic effects. The toxic effects are dependent upon the degree of chlorination, the higher the degree of substitution, the stronger the effects. Acute and chronic exposure can cause liver damage. Signs and symptoms include edema, jaundice, vomiting, anorexia, nausea, abdominal pains, and fatigue. Ingestion may cause still birth, a grey-brown skin, and increased eye discharge in infants born to women exposed during pregnancy. PCBs are potential human carcinogens.

Coal Tar Pitch Volatiles

Route of Entry:	Inhalation, Skin or Eye Contact
Target Organs:	Bladder, Kidneys, Respiratory System, Skin
Hazard:	Toxic
PEL:	0.2 mg/m^3
IDLH:	80 mg/m^3

The benzene soluble fraction of the coal tar pitch includes benzo(a)pyrene, phenanthrene, acridine, chrysene, anthracene and pyrene. Exposure may produce skin, eye, and upper respiratory tract irritation. Photophobia may occur. Liver and kidney damage may result from overexposure. Chronic exposure may produce lung and skin cancer.

Cyanide

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Cardiovascular System, Central Nervous System, Kidneys, Liver, Skin
Hazard:	Toxic
PEL:	5 mg/m^3
IDLH:	50 mg/m^3

Inhalation of cyanide can cause asphyxia and death. Ingestion can cause vomiting and increased rate of respiration. Skin contact can cause weakness, headache, confusion, nausea, slow gasping respiration, eye and skin irritation. Symptoms vary by specific compound.

Naphthalene

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Blood, Central Nervous System, Eyes, Kidneys, Liver, Skin
Hazard:	Combustible (FP 174°F), Toxic
PEL:	10 ppm
IDLH:	250 ppm
IP:	8.12 eV

Naphthalene is a primary irritant and causes erythema and dermatitis upon repeated contact. It is also an allergen and may produce dermatitis. Direct eye contact may produce irritation and cataracts. Inhaling or ingesting high concentration may cause intravascular hemolysis. Symptoms include eye irritation, headache, malaise, profuse sweating, nausea, vomiting, abdominal pain, jaundice, renal tubular blockage, severe anemia or leukocytosis.

Toluene

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Central Nervous System, Eyes, Kidneys, Liver, Respiratory System, Skin
Hazard:	Flammable (FP 40°F), Toxic
PEL:	200 ppm
IDLH:	500 ppm
IP:	8.82 eV

This solvent may cause irritation to the eyes, respiratory tract, and skin. Repeated or prolonged contact with liquid may cause removal of the natural lipids from the skin, resulting in dry, fissured dermatitis. Liquid splashed in the eyes may cause irritation, and reversible damage. Acute exposure results in central nervous system depression, headache, dizziness, fatigue, muscular weakness, drowsiness, incoordination with staggering gait, and coma.

Xylene

Route of Entry:	Inhalation, Ingestion, Skin Absorption, Skin or Eye Contact
Target Organs:	Blood, Central Nervous System, Eyes, Gastrointestinal Tract, Kidneys, Liver, Respiratory System, Skin
Hazard:	Flammable (FP 81-90°F), Toxic
PEL:	100 ppm
IDLH:	900 ppm
IP:	8.44 - 8.56 eV

Xylene may cause irritation to the eyes, nose, and throat. Repeated or prolonged skin contact may cause drying and defatting of the skin which may lead to dermatitis. Ingestion may cause chemical pneumonitis, or hemorrhage. Repeated eye exposure may cause reversible eye damage. At high concentrations xylene may cause dizziness, staggering, drowsiness, unconsciousness, nausea, or abdominal pain.

3.2 HAZARD/RISK ANALYSIS

This hazard/risk analysis identifies the chemical, physical, and ergonomic health and safety hazards associated with treatment plant construction. The work is divided into specific activities or tasks. The anticipated chemical, physical, or ergonomic hazards/risks are given. Pathways for hazardous substance dispersion are also given as appropriate.

The chemical, physical, and toxicological properties, regulatory or recommended protective exposure standards, and potential routes of entry for the select list of contaminants of concern are given in Section 3.1.

The activities to be performed at the Mound Street PCB Site involve subsurface soil sampling and groundwater sampling from existing wells. Personnel should be aware that as the level of personal protective equipment increases, dexterity and visibility may be impacted and performing some tasks may be more difficult. Prudent care should be exercised when working around any machinery or equipment.

1. Subsurface Soil Sampling

Surface soil samples are to be collected utilizing a Geoprobe. Maximum sample depth will be 25 feet.

Hazard

- Inhalation and dermal contact with contaminated soils. See Section **3.1** for chemicals identified in these media.
- Noise generated by heavy equipment will exceed 85 dBA.
- Slips, trips and falls may occur on wet, muddy or frozen surfaces.
- Back strains may occur while collecting the soil samples and bending over to work at ground level.

Control

- Level C PPE utilizing full-face piece respirators will be the basic level of protection until personal breathing zone concentrations are less than 25% of any applicable PEL-TWA. Outer nitrile gloves will be used in conjunction with poly-coated Tyvek coveralls or equivalent for dermal protection. Level C PPE may be downgraded to modified-Level D based upon exposure monitoring and dermal contact.
- Hearing protection, either ear muffs or ear plugs, will be worn in all areas where the noise level exceeds 85 dBA.

2. Groundwater Sampling

Groundwater samples will be collected from existing wells utilizing the Geoprobe vacuum system or disposable bailers.

Hazard

- Inhalation and dermal contact with contaminated water may occur. See Section **1.2** for chemicals identified in the groundwater.
- Back strains may occur while collecting the soil samples and bending over to work at ground level.
- Slips, trips and falls may occur on wet, muddy or frozen surfaces.
- Acids will be added to samples.

Control

- Level D PPE will be the basic level of protection. Outer nitrile gloves will be used in conjunction with poly-coated Tyvek coveralls or equivalent for dermal protection.

3. Sampling Equipment Decontamination

Sampling equipment requiring decontamination includes the Geoprobe sample tubes and other containers or tools used in the collection of samples. All equipment rinsate will be disposed on-site.

Hazard

- Inhalation and dermal contact with contaminated soils and groundwater may occur. See Section **3.1** for chemicals identified in these media.
- Slips, trips and falls may occur on wet, muddy or frozen surfaces.
- Back strain from manually handling pumps and equipment may occur.
- Acids will be used during equipment decontamination.

Control

- Level D PPE will be the basic level of protection. Outer nitrile gloves will be used in conjunction with poly-coated Tyvek coveralls or equivalent for dermal protection.

3.3 HEAT AND COLD STRESS MONITORING

Introduction

Stress can contribute significantly to accidents or harm workers in other ways.

The term stress denotes the physical (gravity, mechanical force, heat, cold, pathogen, injury) and psychological (fear, anxiety, crises, joy) forces that are experienced by individuals.

The body's response to stress occurs in three stages:

- *Alarm Reaction* - in which the body recognizes the stressor and the pituitary-adreno-cortical system responds by increasing the heart rate and blood sugar level, decreasing digestive activity and dilating the pupils.
- *Adaptive State* - in which the body compensates for the stimulation and the stress symptoms disappear.
- *Exhaustion State* - in which the body can no longer adapt to stress and the individual may develop emotional disturbances, and cardiovascular and renal diseases.

The most common types of stress that affect field personnel are heat stress and cold stress. Heat and cold stress which may result from wearing personal protective equipment may be the most serious

hazard to workers during site assessment and remediation activities.

3.3.1 Heat Stress

Heat stress can result when protective clothing decreases natural body ventilation, although it may occur at any time work is being performed at elevated temperatures.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses that is present at remediation sites, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management. In general:

- *Have workers drink 16 ounces of water before beginning work*, such as in the morning or after lunch. Provide disposable, 4 ounce cups, and water that is maintained at 50-60°F. Urge workers to drink 1 - 2 of these cups of water every 20-minutes, for a total of 1 - 2 gallons per day. Provide a cool, preferably air conditioned area for rest breaks. Discourage the use of alcohol in non-working hours, and discourage the intake of coffee during working hours. Monitor for signs of heat stress.

- *Acclimate workers* to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities.

- *Provide cooling devices* to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.

- *Install mobile showers* and/or hose-down facilities to reduce body temperature and cool protective clothing.

- In hot weather, *conduct field activities in the early morning or evening*.

- *Provide adequate shelter* to protect personnel against heat, as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of both heat and cold stress. If possible, set up the shelter in the shade.

- In hot weather, *rotate shifts of workers* wearing impervious clothing.

- *Good hygienic standards must be maintained* by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of heat regulating mechanisms of the body. The individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

- *Symptoms:* Red, hot, dry skin, although the person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature, rapid respiratory and pulse rate; unconsciousness or coma.

- *Treatment:* Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool but not cold water, sponge the body with cool water, or pour water on the body to reduce the temperature to a safe level (100.4°F). Observe the victim and obtain medical help. Do not give coffee, tea or alcoholic beverages.

Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

- *Symptoms:* Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

- *Treatment:* Remove the person to a cool, air conditioned place, loosen clothing, place in a head-low position, and provide bed rest. Consult a physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to maintain body fluid replacement. Have the person drink 1 - 2 cups of water immediately, and every 20-minutes thereafter, until symptoms subside. Total water consumption should be about 1 to 2 gallons per day.

Heat Cramps

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

- *Symptoms:* Acute painful spasms of voluntary muscles; e.g., abdomen and extremities.

- *Treatment:* Remove the person to a cool area and loosen clothing. Have the person drink 1 to 2 cups of water immediately, and every 20-minutes thereafter, until symptoms subside. Total water consumption should be 1 to 2 gallons per day. Consult a physician.

Heat Rash

Heat rash is caused by continuous exposure to heat and humidity and aggravated by chafing clothes. The condition decreases ability to tolerate heat.

- *Symptoms:* Mild red rash, especially in areas of the body in contact with protective equipment.

- *Treatment:* Decrease amount of time in protective equipment, and provide powder to help absorb moisture and decrease chafing.

Heat Stress Monitoring and Work Cycle Management

Acclimatized workers should work under conditions which do not elevate their deep body temperature above 38°C (100.4°F). Since deep body temperature measurement is not convenient, temperature, work load and protective clothing parameters are used to evaluate heat stress.

3.3.2 Cold Stress

Persons working outdoors in low temperatures, especially at or below freezing are subject to cold stress. Exposure to extreme cold for a short time causes severe injury to the surface of the body, or results in profound generalized cooling, causing death. Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears are the most susceptible.

Protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility.

Two factors influence the development of a cold injury: ambient temperature and wind velocity. Wind chill is used to describe the chilling effect of moving air in combination with low temperature.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is soaked with perspiration. Refer to Table 3.1.

Frostbite

Local injury resulting from cold is included in the generic term frostbite. Frostbite of the extremities can be categorized into:

- *Frost nip or incipient frostbite* is characterized by sudden blanching or whitening of skin.

- *Superficial frostbite* is characterized by skin with a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

- *Deep frostbite* is characterized by tissues that are cold, pale, and solid.

To administer first aid for frostbite: Take the victim indoors and rewarm the area quickly in water that is between 39°C and 41°C (102° - 105°F). Give a warm drink -NOT coffee, tea or alcohol. The victim must not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws. Then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medial care.

After thawing, the victim should try to move the injured areas a little, but no more than can be done alone, without help.

NOTE:

- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the part.
- Do not place the part near a hot heat source.

Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F
- Unconsciousness, glassy stare, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

As a general rule field activities shall be curtailed if equivalent chill temperature (°F) is below zero (0°F) unless the activity is of an emergency nature.

Table 3.1
Windchill Chart

WINDCHILL CHART												
WIND SPEED (MPH)	LOCAL TEMPERATURE (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER: In < 1 hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER: Danger from freezing of exposed flesh within one minute.			GREAT DANGER: Flesh may freeze within 30 seconds.				
	Trenchfoot and immersion foot may occur at any point on this chart.											

SOURCE: ACGIH, Threshold Limit Values for Chemical Substances in the Work Environment for 1994-95.

3.4 BIOLOGICAL HAZARDS

Mosquitos, wasps, hornets, bees, ants, ticks, and snakes may be found at the site. Minimize contact with these insects and reptiles. Be alert to their potential presence, especially in wet areas and locations with overgrown vegetation. The use of sprays, ointments, or other materials is not permitted in sampling areas.

4.0 ACCIDENT PREVENTION

- The Site Safety Officer (SSO) has administrative responsibilities for effecting the site accident prevention plan.

- The Site Manager will coordinate daily with those performing assessment and remediation work.

- The Site Safety Officer will hold daily safety meetings. Section 5 gives details of safety meeting content.

- The Site Manager or SSO will put up traffic barriers at entrances to the site to verify that no unauthorized personnel enter the site.

- Section 14 covers emergency response and contingency plans.

- The Site Manager or SSO will continually inspect the work areas for infractions of the Health and Safety Plan.

- The SSO will investigate all accidents and complete an accident investigation report.

5.0 TRAINING

Consistent with OSHA's 29 CFR 1910 and 1926 regulations all site personnel will be trained in accordance with the federal and state regulations. At a minimum, all personnel will be trained to recognize the hazards on-site, the health and safety controls to minimize personnel exposure, the provisions of this Health and Safety Plan, and the responsible personnel.

5.1 GENERAL

Prior to arrival on-site, Sverdrup Environmental, Inc. will be responsible for certifying that their employees meet the requirements of preassignment training.

The following individuals are identified as site supervisors:

Name	Title/Responsibility
Michael McCurdy	Project/Site Manager
Michael McCurdy	Site Safety Officer

5.2 SITE SPECIFIC TRAINING

The following items will be discussed by the Site Safety Officer at the site pre-entry briefing(s). Daily health and safety meetings must be attended by all site personnel. Subjects discussed during the health and safety meetings must be documented in the site log book by Sverdrup Environmental, Inc.

Site Specific Training Meeting	Daily	Periodically	
X	_	X	Site Description, Section 1.3
X	_	X	Physical hazards, Section 3.2
X	_	X	Chemical hazards, Section 3.1
X	_	X	Medical surveillance requirements, Section 7.0
X	_	X	Symptoms of overexposure to hazards; Section 3.1
X	_	X	Site control, Section 10.0
X	_	X	Training requirements, Section 5.0
X	_	X	Engineering controls and work practices, Section 9.0
X	_	X	Overhead and underground utilities
X	_	X	Personnel protective equipment, Section 6.0
X	_	X	Respiratory protection
X	_	X	Air Monitoring, Section 8.0
X	_	X	Decontamination, Section 11 and 12.0
X	_	X	Emergency response plan, Sec. 14.0
X	_	X	Spill Containment, Section 14.7
X	_	X	Confined Space Entry, Section 14.8

6.0 PERSONAL PROTECTIVE EQUIPMENT

This section describes the general requirements of the Levels of Protection (A-D), and the specific levels of protection required for the Mound Street PCB Site.

6.1 PERSONAL PROTECTION LEVELS AND EQUIPMENT

Personnel must wear protective equipment when activities involve known or suspected atmospheric contamination, when hazardous vapor, gases, or particulates may be generated by site activities, or when direct skin contact with hazardous substances may occur. Full face-piece respirators protect lungs, gastrointestinal tract, and eyes against airborne contaminants. Chemical-resistant clothing protects the skin from contact with hazardous contaminants.

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

Level D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise the type of chemical protective clothing will depend upon contaminants and degrees of contact.

The Level of Protection selected is based upon the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.

- Potential for exposure to substances in air, liquid splashes, or other direct contact with material due to work being done.

- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant concentration.

Two levels of personal protection may be utilized during sampling activities. All on-site Sverdrup personnel will be required to comply with the personal protective levels of protection.

Level C:
Full face air purifying respirator
Type GMC-H respirator cartridges (or equivalent)
Disposable coverall
Disposable nitrile gloves or equivalent
Disposable latex inner gloves or equivalent
Chemically-resistant steel toe and shank boots
Disposable or reusable boot covers or equivalent
Hard hat
Eye protection in areas where airborne debris/dust exists

Level D:
Disposable Coverall
Disposable latex gloves or equivalent
Chemically-resistant steel toe and shank boots
Disposable or reusable boot covers or equivalent
Hard hat
Eye protection in areas where airborne debris/dust exists

6.2 SPECIFIC LEVELS OF PROTECTION PLANNED FOR SITE ACTIVITIES

Sverdrup personnel will be performing integrated air monitoring to verify the airborne contaminant concentrations.

Level C personal protective equipment will be worn during soil sampling activities to minimize potential exposure to dust containing suspect PCB contamination.

Level D personal protective equipment will be worn during all other site activities. Groundwater sampling will not pose an exposure to dust containing suspect PCB contamination.

6.3 SUMMARY OF SITE ACTIVITY REQUIREMENTS

The following table summarizes the minimum levels of protection:

Activity	Level of Protection	Monitoring Equipment
Within exclusion zone during soil and groundwater sampling activities	C	An Hnu, Thermo Model 58B Photoionization detector, or Foxboro Century Flame Ionization detector will be used to screen the soil and employee breathing zone during soil and groundwater sampling. Any organic vapor detected above baseline will be evaluated further with direct reading colorimetric detector tubes, including benzene, toluene, xylene and naphthalene. Calibrated SKC personal sampling pump or equivalent with 37 mm mixed cellulose ester 0.8 micrometer pore size filters will be used to evaluate metals exposure.
All other site activities	D	Same as Above.

7.0 MEDICAL SURVEILLANCE PROGRAM

This medical surveillance program is designed to survey preemployment or baseline conditions prior to potential exposures and monitor physical conditions on a regular basis.

7.1 BASELINE OR PREASSIGNMENT MONITORING

Prior to being assigned to this site's sampling activities, each employee must receive a preassignment or baseline medical examination. The content of this examination has been reviewed by the Sverdrup Environmental, Inc. physician who is Board Certified in Occupational Medicine. The minimum medical monitoring requirements for work at the Mound Street PCB site is a follows:

- Complete medical and work history
- Physical examination
- Pulmonary function tests ($FEV_{1.0}$, FVC, and $FEV_{1.0}$ FVC ratio)
- Chest X-ray (as recommended by the physician)
- EKG
- Eye examination and visual acuity
- Audiometric Testing at 500, 1000, 2000, 3000, 4000, 6000 Hertz
- Urinalysis
- Blood chemistry, including hematology, serum analyses, and heavy metals toxicology and liver

The preassignment examination categorizes employees as fit-for-duty and able to wear respiratory protection.

7.2 PERIODIC MONITORING

In addition to a baseline examination for all employees involved in sampling activities, a periodic annual examination shall be performed unless the advising physician believes a shorter interval is appropriate. The Sverdrup Environmental, Inc. medical consultant has prescribed an examination which fulfills OSHA 29 CFR 1910 and 1926 requirements.

The Site Manager/Site Safety Officer will verify all personnel working in potentially contaminated areas at the Mound Street PCB Site are currently (within 12 months) participating in a medical surveillance program. This is done by obtaining a copy of the physicians written opinion form for the medical surveillance at the job site.

7.3 EXPOSURE/INJURY/MEDICAL SUPPORT

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and medical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. The Sverdrup Environmental, Inc. medical consultant will advise as to the type of test required to accurately monitor for exposure effects.

7.4 EXIT MEDICAL EXAMINATION

At termination of employment or reassignment from this job site, or at the physician's discretion each employee shall complete an exit medical surveillance examination. The content of the examination is to be determined by the employer's medical consultant. The minimum medical monitoring requirements for work at the Mound Street PCB site are found in Section 7.1.

8.0 FREQUENCY AND TYPES OF PERSONAL AIR MONITORING/ ENVIRONMENTAL SAMPLING

This section explains the general concepts of an air monitoring program and specifies the monitoring activities that will take place during sampling activities at the Mound Street PCB site.

8.1 ENVIRONMENTAL MONITORING

Sverdrup will perform integrated personal air monitoring at this Site. Sverdrup will evaluate this data to determine the effectiveness of engineering controls and the appropriate level of protection is being worn. SKC personal air samplers will be used to perform integrated monitoring during sampling activities. This sampling will be performed in the employee breathing zone. Concentrations, instruments and calibration data will be maintained in the field log book.

Contaminant	Equipment	Sampling Strategy
PCB	SKC air samplers with glass fiber filter and florisil tube. Collect at 2 L/min.	integrated
Arsenic, barium, chromium, lead	SKC air samplers with mixed cellulose ester membrane filters. Collect at 2 L/min.	integrated
Coal tar pitch, volatiles (benzene soluble fraction)	SKC air samplers with glass fiber filter. Collect at 2 L/min.	integrated

9.0 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

Field work will be conducted only during daylight hours unless adequate lighting is provided. The buddy system will be observed at all times, where a minimum of two people work together within eye-sight or not greater than 100 ft of each other. Entry and exit into the exclusion zone, and contamination reduction zone will be permitted only through designated access points, except during an emergency or as authorized by the SSO. Personnel entering the exclusion zone must be wearing the required minimum protective clothing and they must exit these areas at the decontamination station.

No eating, drinking, smoking, or any other activity involving hand-to-mouth contact will be allowed by field personnel within exclusion zones or prior to completion of proper personnel decontamination sequence. Field personnel must thoroughly wash their hands and faces before eating.

Facial hair will not be allowed where the respirator seal contacts the face.

Contact lenses may not be worn during field work. Sverdrup personnel expected to use respirators should provide a pair of glasses that can be adapted to the respirator worn. The appropriate mounting hardware will be provided. All other personnel should provide their own prescription glasses and should be prepared to also wear safety glasses, if necessary.

A waste storage area will be located at the site at which all personal protective equipment wastes generated will be stored pending their proper disposal.

Table 9.1 provides a checklist for PPE inspection.

Tables 9.2 and 9.3 provide standing orders for work zones.

TABLE 9.1
SAMPLE PPE INSPECTION CHECKLISTS

CLOTHING

Before use:

- Determine that clothing material is correct for the specified task at hand.

- Visually inspect for:
  - imperfect seams
  - non-uniform coatings
  - tears
  - malfunctioning closures

- Hold up to light and check for pinholes.

- Flex product:
  - observe for cracks
  - observe for other signs of deterioration

- If the product has been used previously, inspect inside and out for signs of chemical attack:
  - discoloration
  - swelling
  - stiffness

During the work task, periodically inspect for:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening.
- Closure failure.
- Tears.
- Punctures.
- Seam Discontinuities.

GLOVES

Before use:

- Visually inspect for:
  - imperfect seams
  - tears, abrasions
  - non-uniform coating
  - pressurize glove with air, listen for pin-hole leaks.

TABLE 9.2
STANDING ORDERS FOR THE EXCLUSION ZONE

- No smoking, eating, or drinking in this zone.
- No horse play.
- No matches or lighters in this zone.
- Check-in upon entrance to this zone.
- Implement the communications system.
- Line of sight must be in position.
- Wear the appropriate level of protection as defined in the Health and Safety Plan.

TABLE 9.3
STANDING ORDERS FOR CONTAMINATION REDUCTION ZONE

- No eating, smoking, or other tobacco products in this zone.
- No horse play.
- No matches or lighters in this zone.
- Wear the appropriate level of protection.
- Liquids may be consumed from squeeze bottles within this zone.

10.0 SITE CONTROL MEASURES

This section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety plan.

10.1 SITE MAP

Figure 10.1 provides a site map.

10.2 WORK ZONE DEFINITION

The three work zones established at this Site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone. Tape, cones or other warning barriers will be placed to identify the exclusion zones, contamination reduction zones and support zones.

Exclusion Zone: Active work areas where soil, sediment, surface water, or groundwater sampling is being performed. Level C personal protective equipment shall be used during soil sampling activities, unless another level of PPE is appropriate. Level D personal protective equipment shall be used during sediment, surface water and groundwater sampling activities, unless another level of PPE is appropriate. The Exclusion Zone will encompass all contaminated areas until the air monitoring indicates no contamination or exposure exists.

Contamination Reduction Zone: The corridor between the Exclusion Zone and the Support Zone where decontaminated will take place. Appropriate PPE will be donned in the Contamination Reduction Zone prior to entry into an Exclusion Zone. PPE that has been used in an Exclusion Zone will be removed in the Contamination Reduction Zone prior to entry to the Support zone.

Support Zone: Areas where site administrative activities are conducted. These areas are uncontaminated and where no exposure is anticipated. No PPE is required in this zone.

10.3 SITE COMMUNICATIONS

Successful communications between field teams and contact with personnel in the support zone is essential. The following communications system will be available during activities at the site.

- Hand Signals

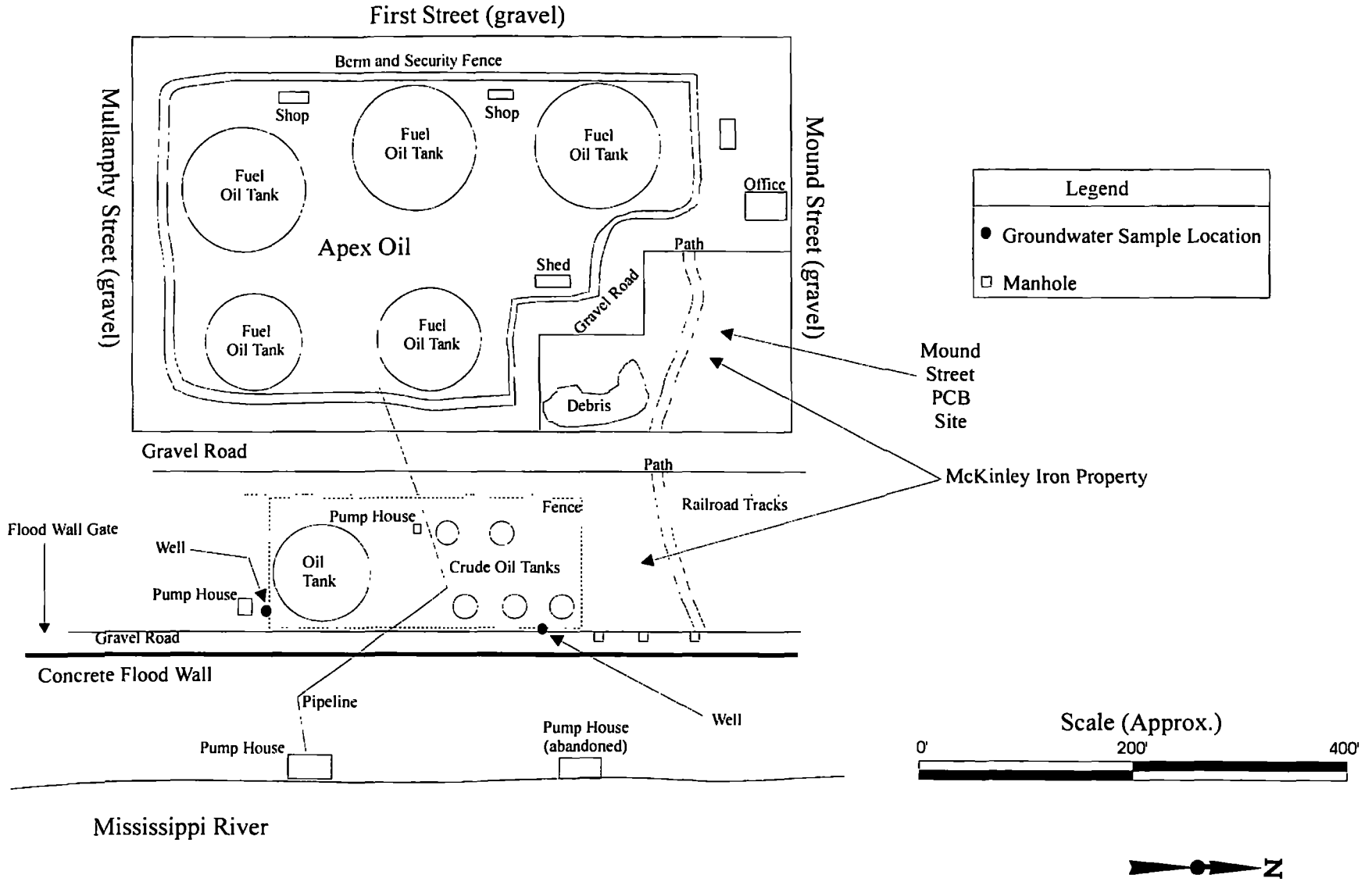
Signal	Definition
Hands clutching throat	Out of air/can't breath
Hands on top of head	Need assistance
Thumbs up	OK/I'm alright/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

10.4 SITE SECURITY

Entry and exit to and from the site will be limited to authorized personnel.

10.5 SITE ACCESS

Entry and exit to and from the site will be permitted only through designated access points, except during an emergency or as authorized by the SSO.



Sources: E&E/FIT 1991. SSI Laclede Coal Gas Site. St. Louis, Missouri. MDNR 1994. PA Mound Street PCB Site.	Project No.. 010865-370303	Mound Street PCB Site St. Louis, Missouri	Site Map	Figure No.: 2
		SVERDRUP		1/96

11.0 PERSONAL DECONTAMINATION FACILITIES AND PROCEDURES

11.1 PERSONAL HYGIENE

Sverdrup personnel must thoroughly wash their hands and faces before eating. Facial hair will not be allowed where the respirator seal contacts the face.

11.2 PERSONAL DECONTAMINATION

Personnel and equipment decontamination is necessary when personnel or equipment enter and exit the exclusion zones and contamination reduction zones.

Personnel decontamination will be performed at a decontamination pad consisting of polypropylene sheeting. Personnel decontamination will consist primarily of soap and water washings and water rinsing of reusable exterior protective gear to remove contaminants, followed by removal of the equipment. The extent of washing required, or modifications to the sequence, may be specified by the SSO. Coveralls should be removed by turning the clothing inside out. Steps in decontamination will be:

- Wash work gloves, boots, and outer protective coverall (if water resistant and reusable);
- Rinse work gloves, boots, and coveralls;
- Remove PVC or rubber boots;
- Remove tape at wrists, ankles;
- Remove outer suit (also gloves, hard hat, boot covers);
- Remove respirator;
- Wash and rinse respirator;
- Remove latex gloves or equivalent.

Non-reusable equipment will be collected in plastic trash bags. These materials will be disposed of as solid waste unless field evaluations indicate that the material should be containerized for disposal as a special waste or a hazardous material.

Respirators will be rinsed with potable water in the field after each use and will be cleaned at the end of each day using a soap and water wash followed by a potable water rinse. Respirators will be inspected daily for damage, missing parts, and proper function. A personnel decontamination station will be established at the main decontamination area.

12.0 EQUIPMENT DECONTAMINATION FACILITIES AND PROCEDURES

12.1 EQUIPMENT DECONTAMINATION

Decontamination of sampling equipment will be performed to limit the migration of contaminants off-site and between work areas on the site. All equipment and other tools will be cleaned prior to site entry to remove grease, oil, encrusted dirt, or other materials. An inspection of the equipment will be made by the Site Manager/SSO prior to approving equipment for use on-site.

Decontamination of small reusable equipment will be performed at a designated location within the contamination reduction zone. Decontamination of equipment will consist of soap and water washing followed by a series of rinses:

- Tap water rinse.
- Deionized water rinse.
- 10% nitric acid rinse (for metals).
- Deionized water rinse.

Following decontamination, clean equipment will be allowed to air-dry prior to reuse. The Site Manager/Site Safety Officer will be responsible for inspecting all equipment leaving the site for adequacy of decontamination.

12.2 DISPOSITION OF DECONTAMINATION WASTES

Disposition of personal protective equipment will be collected in plastic trash bags and placed in a solid waste disposal dumpster for off site removal.

Decontamination water will be collected and disposed on the ground in the exclusion areas. Sverdrup will take precautions to prevent contaminated water from leaving the exclusion zone.

12.3 DOCUMENTATION

Implementation of the provisions of the Health and Safety Plan will be completely documented. The Project Manager/Site Safety Officer will set up and maintain a separate file to receive health and safety related records and activity reports. This file should contain the following records:

- One copy of the Health and Safety Plan
- Signed copies of the Compliance Agreement contained in Section 17.0
- One copy of the Sverdrup Health and Safety Manual
- Records of usage and calibration of environmental monitoring equipment
- Records of safety violations and remedial actions taken
- Sverdrup personnel injury/exposure incident reports, OSHA 200 forms, material safety data sheets

A health and safety field logbook will be maintained on-site and will contain such information as:

weather conditions, all personnel on-site, levels of protection worn, monitoring instrumentation readings (average, peak, and background), subjects discussed during daily site health and safety briefings, and safety violations.

13.0 EMERGENCY FIRST AID REQUIREMENTS AND EQUIPMENT

- American National Red Cross First Aid Handbook
- Compresses
- Gauze & gauze roller bandage
- Triangular bandages
- Eye dressing packet
- Portable eye wash unit
- Safety rope & harness
- Soap or waterless hand cleaner and towels
- Band aids
- Tape
- Scissors
- Tweezers
- Razors

14.0 EMERGENCY RESPONSE AND CONTINGENCY PLANS

This section describes contingencies and emergency planning procedures to be implemented at the Mound Street PCB site. This plan is compatible with local, state and federal disaster and emergency management plans as appropriate. Working conditions requiring a confined space entry permit are not part of this project.

14.1 PRE-EMERGENCY PLANNING

During the site briefings held periodically, all employees will be trained in and reminded of provisions of the emergency response plan, communication systems, and evacuation routes.

The plan will be reviewed and revised if necessary, on a regular basis by the Site Manager/Site Safety Officer. This will verify that the plan is adequate and consistent with prevailing site conditions.

14.2 PERSONNEL ROLES AND LINES OF AUTHORITY

The Site Manager has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area. He is additionally responsible for verifying corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The SSO/Site Manager will direct responses to any medical emergency.

All employees are responsible for assisting the Site Manager within the parameters of their scope of work.

14.3 EMERGENCY CONTACT/NOTIFICATION SYSTEM

The following list provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the Site Manager and notify the appropriate emergency organization. In the event of a fire or spill, the Site Manager will notify the appropriate local, state, and federal agencies:

Organization	Contact	Telephone
Hospital - Barnes		314-362-5000
Ambulance Service		911
Fire Department Emergency - St. Louis		911
Police Emergency - St. Louis		911
Missouri Department of Natural Resources		314-526-3348
RCRA/Superfund (M-F 8:30 am - 7:30 pm EST)		800-424-9346
Title III Community Right to Know (Answers questions about Regulatory issues)		800-535-0202
National Response Center		800-424-8801
Center for Disease Control (CDC) (Atlanta, Georgia)		404-639-3311
Poison Control Center (St. John's Hospital, Springfield)		800-252-2022
CDC - Emergency Response (Chemical spills, dumps and exposure to radiation		404-639-0615
National Institute for Occupational Safety and Health (NIOSH), Cincinnati, Ohio		800-356-4674
Chemtrec (24 hour emergency no.)		800-424-9300
Sverdrup Environmental Project Manager	M. McCurdy	913-663-2108

14.4 EVACUATION ROUTES/PROCEDURES

Project Manager and Site Manager are to be contacted for all emergencies. Medical emergencies will be taken to:

Barnes Hospital
1 Barnes Hospital Plaza
St. Louis, Missouri
(314) 362-5000

Barnes Hospital located at 1 Barnes Hospital Plaza (off of Kingshighway Blvd.). From the site, take Mullanphy Street west to Broadway, Broadway south to Spruce Street, Spruce Street west to Interstate 64 west bound on-ramp, I-64 west to Kingshighway Blvd. North bound exit, Kingshighway north to Barnes Hospital on the right.

14.5 EMERGENCY MEDICAL TREATMENT PROCEDURES

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the Project Manager and the Sverdrup Health and Safety Manager.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site. This information is included in Section 3.0.

Any vehicle used to transport contaminated personnel will be treated and decontaminated as necessary.

14.6 FIRE OR EXPLOSION

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the Site Manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on-site.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available on-site to control or extinguish the fire; and,
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

14.7 SPILL CONTAINMENT PROGRAM

The procedures defined in this section comprise the spill contaminant program in place for activities at the Mound Street PCB Site.

- All drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the waste that they will contain.

- Drums and containers shall be inspected and their integrity verified prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions, shall be positioned in an accessible location and inspected prior to further handling.

- Operations on-site will be organized so as to minimize the amount of drum or container movement.

- Employees involved in the drum or container operations shall be trained concerning the hazards associated with the containers.

- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equipment (absorbent, etc.) will be stationed in the immediate area. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.

- Drums or containers that cannot be moved without failure, shall be emptied into a sound container.

- Fire extinguishing equipment meeting 29 CFR 1910 shall be on hand and ready for use to control incipient fires.

14.8 CONFINED SPACE ENTRY PROCEDURES

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, limited visibility, and restricted movement. This section will establish requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1910, 1926, and NIOSH 87-113. The Sverdrup Director of Health and Safety will be notified before any confined space entry is attempted.

This procedure has been assembled to protect Sverdrup Environmental, Inc (SvE) employees from the hazards of entry into permit-required confined spaces.

14.8.1 DEFINITIONS

A confined space means a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and

2. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

3. Not designed for continuous employee occupancy.

A permit-required confined space means; a confined space that has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere;

2. Contains a material that has the potential for engulfing an entrant;

3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a small cross-section; or

4. Contains any other recognized serious safety or health hazard.

14.8.2 GENERAL REQUIREMENTS

14.8.2.1 WORKPLACE EVALUATION

SvE has evaluated the workplace to determine if any spaces are permit-required confined spaces. The permit-required confined spaces include:

LOCATION	DESCRIPTION
Job Site	None

14.8.2.2 SIGNS

Danger signs have been posted on the SvE identified permit required confined spaces. The sign reads:

"Danger - Permit-Required Confined Space, Do Not Enter"

14.8.2.3 PERMIT SPACES NOT ENTERED BY SvE EMPLOYEES

SvE has identified permit-required confined spaces which are not anticipated to be entered by SvE employees. No permit-required confined spaces were identified.

14.8.2.4 ALTERNATIVE PROCEDURES TO ENTER A PERMIT SPACE

SvE may opt to demonstrate the only hazard posed by selected permit-required confined spaces is an actual or potential hazardous atmosphere and continuous forced air ventilation alone is sufficient to maintain the permit space safe for entry. SvE will develop monitoring and inspection data to support the alternative procedures. The procedure for this entry will include:

- Any condition making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

- When the entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

- Before entry into the space, the internal atmosphere will be tested with a calibrated direct reading instrument for:

  (1) Oxygen content
  (2) Flammable gases and vapors
  (3) Potential toxic air contaminants

- There may be no hazardous atmosphere within the space whenever any employee is inside the space.

- A clear source of forced air ventilation shall be used to eliminate any hazardous atmosphere.

- The atmosphere within the space shall be periodically tested to verify there is no accumulation of a hazardous atmosphere. If a hazardous atmosphere is detected, the SvE employee will leave the space. The space shall be evaluated to determine how the hazardous atmosphere developed. Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry.

- SvE shall certify in writing the space is safe for entry. The permit-required confined space entry form will be used as the record of certification.

14.8.2.5 SUB-CONTRACTORS

When SvE arranges to have contractors perform work that involves permit space entry, SvE will:

- Inform the contractors that the work place contains permit spaces and permit space entry is allowed only through compliance with a permit space program.

- Inform the contractor of the known hazards associated with the permit space entry based on SvE experience.

- Inform the contractor of any precautions or procedures that SvE has implemented for the protection of employees in or near permit spaces where contractor personnel will be working such as hazards associated with working machinery, lift truck movement and noise.

- Coordinate the permit space entry with the contractors.

- Debrief the contractors at the conclusion of the entry operation regarding the permit space program and any hazards confronted during the entry.

14.8.3 PERMIT-REQUIRED CONFINED SPACE

14.8.3.1 Permit Space Program Components

1. SvE has implemented control procedures to prevent unauthorized entry into permit-required confined spaces. The control includes identifying the permit-required spaces and posting "DANGER PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" on the permit-required space access point.

2. SvE has identified and evaluated the hazards associated with each permit required confined space. The physical and chemical hazards include; falls, burns, electrical shock, caught in points of operation, noise, limited visibility due to low illumination levels, potential for oxygen deficiency, exceeding a lower explosive limit, inhalation of organic vapor or skin contact with water treatment chemicals. The hazards and controls are addressed on the permit-required confined space entry form.

3. SvE has identified and implemented the procedures and practices for a safe permit space entry. These practices include:

    - The confined space will be adequately illuminated to perform the assigned entry task. Fall protection using a body harness, lifeline and tripod will be used to prevent falls. Electrical power, and points of operation will be locked and tagged out. The oxygen concentration in the space will be between 19.5% and 23.5% oxygen. The lower explosive limit will be less than 10% of LEL. No chemical concentration will exceed any applicable permissible exposure limit.

- The permit space will be isolated by lockout and blanking to prevent materials or product entering the space.

- Liquid transfer lines and tanks will be flushed with water, manholes and leachate collection vaults will be purged with air to eliminate atmospheric hazards.

- The permit space will be safeguarded with barrier tape, barricades or fencing to protect the entrants from adjacent printing operations.

- The SvE permit space entry supervisor will verify the physical and chemical conditions in the permit space are acceptable for entry throughout the duration of the authorized entry. The physical hazards will be safeguarded and the chemical hazards will be controlled.

4. The following equipment will be supplied and used as applicable during the permit space entry:

   (a) Testing and monitoring equipment. SvE is using Industrial Scientific, or equivalent, oxygen and lower explosive limit portable detector to monitor the confined space atmosphere. A photoionization or flame ionization detector is used to identify other gases and vapor.

   (b) Ventilating equipment to obtain acceptable entry conditions. Equipment includes an air blower to move air into the confined space or exhaust air from the space.

   (c) Communication equipment to provide continuous communication between the entrants and entry supervisor. Close proximity between the entrants, attendant and supervisors affords visual and verbal communication.

   (d) Personal protective equipment includes ear and eye protection, gloves, and skin protection. If atmospheric hazards are identified, the space will be ventilated to eliminate the atmospheric hazard. Respiratory equipment will be worn when ventilation has not completely controlled the atmospheric hazard.

   (e) Lighting equipment is provided by using portable lights on extension cords to enable employees to see well enough to work safely and to exit the space quickly in an emergency.

   (f) Barrier and shields including warning tags or fencing is used to warn and limit access to the confined space.

   (g) Aluminum or fiberglass step or extension ladders are to be used for safe

ingress or egress by authorized entrants.

(h) The local fire department is providing the personnel and equipment for emergency rescue. The fire department will regularly inspect the job site and become familiar with the site conditions. The fire department is notified prior to each permit required confined space entry.

5. Evaluate permit space conditions:

   Test the permit space before each entry and then continuously during the entry. For atmospheric hazards, test first for oxygen then combustible gas and vapor, then toxic gas and vapor.

6. At least one (1) attendant will be positioned outside the permit space for the duration of entry operations.

7. In the event an entrant becomes disabled or cannot leave the permit space, the attendant will contact his supervisor immediately. The attendant will then attempt to extract the entrant from the permit space without entering the permit space. The attendant or supervisor will contact the fire department for emergency rescue.

8. A permit required confined space entry form has been assembled by SvE and will be completed by the Supervisor prior to any permit space entry. The permit is applicable for one shift and for only those SvE employees identified on the permit. After the permit space entry is completed or expired, the permit will be given to the appropriate Supervisor for review and permit space entry revision if necessary. The canceled permits will be retained for one (1) year after each entry.

SvE may opt to perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review will be performed.

14.8.4 PERMIT SYSTEM

14.8.4.1 PROCESS

- Before the entry is authorized, SvE will identify and evaluate the confined space hazards and implement a control strategy to protect our employees.

- Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

- The completed permit will be posted at the entry portal so all entrants can confirm pre-entry preparations have been completed.

- The duration of the permit may not exceed the time required to complete the task or the assigned tasks.

- The entry supervisor will terminate the entry permit when:

  a. The entry operations have been completed.
  b. A condition not allowed under the entry permit arises in or near the permit space.

- SvE will retain each permit for one (1) year for review and revision.

14.8.4.2 PROCEDURES

PERMIT REQUIRED CONFINED SPACE PROCEDURES

1. Obtain a confined space entry permit from the SvE Health and Safety Manual.

2. Read the permit required confined space program.

3. Complete the confined space entry permit.

4. Call the fire department rescue team to inform them you will be working in the confined space. Tell them where the confined space is and how long it will take to do the work.

5. Obtain the necessary safety equipment needed to do the job.

6. Obtain the necessary test equipment to check the confined space for hazards common to the confined space.

7. Supervisor, entrant and attendant fill out and sign the confined entry space permit.

8. Supervisor or attendant monitor test equipment during the entry and log the readings.

9. Return all test and safety equipment to their proper storage areas.

10. Call the fire department rescue team and inform them the work is completed.

The ten (10) steps may be applied to all confined spaces at SvE projects.

14.8.5 ENTRY PERMIT

THE ENTRY PERMIT SHALL IDENTIFY:

- The permit space to be entered
- The purpose of the entry
- The date and duration of the entry permit
- The authorized entrants
- The attendants name
- The entry supervisor authorizing the entry
- The hazards of the permit space
- The measures to control the permit space hazards
- The acceptable entry conditions
- The results of the initial and periodic atmospheric testing
- The rescue and emergency services to be summoned
- Communication procedures used by entrants and attendants to maintain contact during entry
- Personal protective equipment and testing equipment to be used
- Lockout/Tagout or hot work permits needed for the entry.

14.8.6 TRAINING

14.8.6.1 HAZARD IDENTIFICATION:

SvE employees who are entrants, attendants and supervisors will be trained to recognize and control the entry hazards before a permit-required confined space entry occurs.

14.8.6.2 TIMING

SvE will train the entrants, attendants and supervisors before the employee is assigned permit-required confined space duties, before there is a change in assigned duties, whenever there is a change that presents a new hazard, whenever there are deviations or inadequacies in the employee's use of these procedures.

14.8.6.3 PROFICIENCY AND CERTIFICATION

SvE will establish employee proficiency in the duties associated with the safe entry into permit-required confined spaces. SvE will certify the training has occurred. The certification will contain the employee's name, signature of the trainer, and dates of training.

14.8.7 DUTIES OF AUTHORIZED ENTRANTS

SvE will verify the entrants:

1. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

2. Properly use equipment.

3. Communicate with the attendant as necessary enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space.

4. Alert the attendant whenever;

   (I) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

   (ii) The entrant detects a prohibited condition; and

5. Exit from the permit space as quickly as possible whenever:

   (I) An order to evacuate is give by the attendant or the entry supervisor.

   (ii) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

   (iii) The entrant detects a prohibited condition, or

   (iv) An evacuation alarm is activated.

14.8.8 DUTIES OF ATTENDANTS

SvE will verify the attendant:

1. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
2. Is aware of possible behavioral effects of hazard exposure in authorized entrants;
3. Continuously maintains an accurate count of authorized entrants in the permit space.
4. Remains outside the permit space during entry operations until relieved by another attendant;
5. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
6. Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

   (I) If the attendant detects a prohibited condition;

   (ii) If the attendant detects the effects of hazard exposure in an authorized entrant;

   (iii) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

   (iv) If the attendant cannot effectively and safely perform all the duties required.

7. Summon rescue and other emergency services as soon as the attendant determines that entrants may need assistance to escape from permit space hazards;

8. Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

   (I) Warn the unauthorized persons that they must stay away from the permit space;

   (ii) Advise the unauthorized persons that they must exit immediately if they have entered permit space; and

   (iii) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

9. Performs non-entry rescues as specified by SvE rescue procedure; and

10. Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

14.8.9 DUTIES OF ENTRY SUPERVISOR

SvE will verify the supervisor:

1. Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

2. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

3. Terminates the entry and cancels the permit when the permit expires or hazards have changed;

4. Verifies that rescue services are available and that the means for summoning them are operable;

5. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

6. Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

14.8.10 RESCUE AND EMERGENCY SERVICES

SvE will use a local Fire Department for rescue and emergency services. The rescue service will simulate a rescue operation at least once every twelve months. The fire department members responding to the rescue will be trained in basic first aid and cardiopulmonary resuscitation.

SvE will inform the rescue service of the hazards they may confront when called on to perform rescue at the job site and provide the rescue service with access to all permit spaces from which rescue may be necessary so the rescue service can develop appropriate rescue plans and practice rescue operations.

SvE will provide a retrieval system to facilitate entrant removal from the permit space and reduce entrant falls. The retrieval system will include a chest or body harness with a retrieval line attached at the center of the entrant's back near shoulder level. The other end of the retrieval line will be attached to a mechanical device or fixed point outside the permit space to retrieve the entrant. The mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 (five) feet deep.

14.8.11 DISCIPLINARY ACTION

Violation of this program will be cause for disciplinary action such as reprimand, suspension, or even discharge, depending entirely upon the nature and seriousness of the offense and the past record of the individual involved.

15.0 RECORD KEEPING

Implementation of the provisions of this Health and Safety Plan must be completely documented. The Site Manager/Site Safety Officer must set up a separate file to receive health and safety related records and activity reports. This file should contain the following records:

- One copy of the site specific Health and Safety Plan.
- A list of personnel engaged in each site activity and verification of the use of the specified protective and environmental monitoring equipment.
- Employee injury/exposure incident reports.
- Safety violation records and remedial actions taken.
- Other pertinent health and safety related observations.
- Air monitoring equipment calibration records, sampling data sheets, and chain-of-custody forms.

All field personnel must sign the Compliance Agreement, indicating that they have attended a briefing by the Site Manager/Site Safety Officer, understand, and agree to abide by the provisions of this Health and Safety Plan prior to working at the Mound Street PCB site. Personnel will be trained by the Site Manager/Site Safety Officer before entering the site.

16.0 APPROVALS

Michael W McCurdy
Project Manager

2-8-96
Date

Brian Knaus
Sverdrup Health and Safety Manager

1-29-96
Date

17.0 COMPLIANCE AGREEMENT

I, _____, have read this Health, Safety, and Emergency Response Plan and hereby agree to abide by its provisions and to aid the Site Safety Officer in its implementation. I understand that it is in my best interest to see that site operations are conducted in the safest manner possible; therefore, I will be alert to site health and safety conditions at all times.

_____ _____

Signature Date